Aquatic Organisms Report

Eastern Divide Insect and Disease Phase II (Revised) Project

Eastern Divide Ranger District

Jefferson National Forest

Bland, Giles, Pulaski, and Wythe Counties, Virginia

Significant Issue

Concern that the project will adversely impact water quality and aquatic communities in the project vicinity.

Scope of the Analysis

With regards to impacts to the aquatic ecosystem, the geographic scope of this analysis will be identical to that analyzed for the water quality and sedimentation aspect of the water resource. The geographic scope of the cumulative analysis for aquatic species are the watersheds of Dismal Creek down to its confluence with Kimberling Creek, Nobusiness Creek down to its confluence with and including Ding Branch, Little Walker Creek down to its confluence with Walker Creek, Pondlick Branch down to its confluence with Tract Fork, Brown Lick Branch down to its confluence with Beaverdam Creek, and Peak Creek in two sections, 1) above Gatewood Reservoir Dam down to the dam, and 2) below Gatewood Reservoir Dam down to its confluence with Tract Fork. This analysis area was chosen because it is estimated that effects below this point would be insignificant and immeasurable. The time periods used for the cumulative analysis will be similar to those used for analyzing sedimentation effects to the water resources.

Existing Conditions

Existing conditions of aquatic habitats in the project area include ephemeral, intermittent, and perennial streams that feed the above-mentioned watersheds. Dismal Creek supports the Federally Endangered Candy darter and has been identified as proposed critical habitat for that species. This watershed is within a 6th level watershed (HUC# 050500020105) covered by the "Federally Listed Endangered and Threatened Mussel and Fish Conservation Plan" (Conservation Plan) developed by the Forest in close coordination with the U.S. Fish and Wildlife Service (2004). In addition, Dismal Creek, Pearis Thompson, Standrock Branch, and other tributaries within the Dismal Sale Area are Class III wild brook trout streams. Standrock Branch supports regionally significant southern strain brook trout. NoBusiness Creek and Ding Branch are likewise Class III wild brook trout streams within the Dismal Sale Area. All of the streams would additionally support a cold/cool-water small stream fish assemblages that could include blacknose dace, mountain redbelly dace, rosyside dace, rainbow darter, tongue-tied minnow, mottled sculpin, fantail darters and bluehead chub. Kimberling Creek, downstream from the proposed

project and outside the bounds of the cumulative effects analysis area supports the FS sensitive mussel species green floater. The upper reaches of Peak Creek within and downstream from the Peak Creek Sale Area are cool water stream reaches supporting wild rainbow trout. This and other streams in the proposed action area would support cool/warm water fish assemblages that could include: smallmouth bass, largemouth bass, rock bass, bluegill, bluehead chub, creek chub, fantail darter, mountain redbelly dace, rosyside dace, margined madtom, mottled sculpin, central stoneroller, saffron shiner, and northern hogsucker (VAFWIS Species Observations 2019).

Wild trout are the Management Indicator Species (MIS) for cold water habitats in the Jefferson Forest Plan. The Riparian Area Desired Condition maintains the natural stream system hydrology, water quality within a range that ensures aquatic species survival, and the biological integrity of aquatic communities. In addition, streamsides are managed in a manner that restores and maintains amounts of Large Woody Debris (LWD) sufficient to maintain habitat diversity for aquatic and riparian-dependent species (approximately 200 pieces per mile) (OBJ 2.01, 2004 JEFF Plan page 2-6).

Bioindicators

Aquatic macroinvertebrate communities integrate the physical, chemical and biological components of the riparian ecosystem, and have been successfully used as bioindicators to monitor change and impacts (EPA 1989). A Macroinvertebrate Aggregated Index for Streams (MAIS) (ranging from a score of 0 to 18) incorporates nine ecological aspects (metrics) of the aquatic macroinvertebrate community to evaluate the current condition of a stream relative to others within the same ecological section (Smith and Voshell 1997). It also establishes a baseline to evaluate effectiveness of standards, guidelines and mitigation measures in preventing changes and impacts to the aquatic community.

Sample sites were selected downstream of management activity areas to monitor the impacts on stream health of projects including but not limited to timber sales and prescribed burns. Other samples were collected to create a baseline of stream conditions within the forest. Only samples collected from March through the first week in June were compared to minimize seasonal variability in structure of macroinvertebrate communities. Across the Forest, 1857 samples were collected, analyzed and assigned an overall MAIS score (0-18). Of these samples, 76% were in the “good” and “very good” categories. An analysis of benthic and water quality data by Smith and Voshell (2013) indicated that the macroinvertebrate condition is significantly correlated to ANC and pH, and that several specific benthic metrics (Ephemeroptera taxa, Percent ephemeroptera, Percent scrapers and HBI) are responding to changes in ANC and pH. The greatest values of the benthic metrics tend to occur at ANC values that are 20 or greater. As described above, roughly 20% of the sites had trends in ANC and pH; except for limed streams the majority of those trends were decreasing. These sites with low ANC or pH would have “poor” or “fair” MAIS scores.

Smith and Voshell (2013) also compared pre-activity macroinvertebrate metrics with post-activity metrics for streams located below timber harvests and prescribed burns at various locations across the Forest and concluded that “management practices are successful at reducing effects on aquatic

organisms" from these activities. The results showed no decline in macroinvertebrates following timber sales or prescribed burns.

Within the project area, macroinvertebrate samples have been collected from project area streams and tributaries at various locations beginning in 1993. Some of the streams in the area are intermittent and would be expected to have reduced macroinvertebrate assemblages related to low flow conditions, especially in the summer or fall. Scores range from very poor to very good (see Table 1 below).

Table 1. MAIS scores from Project Area Streams

StationID	StreamName	SURVEYREASON	Pre or Post Activity	CollDate	MAISScore	Assessment
8006	No Business Creek	Inventory		7/27/1993	15	Good
8010	Dismal Creek	Watershd Restoration	Pre	5/4/1995	17	Very Good
8011	Pearis Thompson Branch	Inventory		5/8/1995	17	Very Good
8011	Pearis Thompson Branch	Inventory		5/15/1997	17	Very Good
8012	Dismal Creek	Inventory		5/8/1995	15	Good
8020	Dismal Trib	Inventory		5/4/1995	14	Good
8023	Dismal Creek (Horse Camp)	Horse Camp	Pre	4/12/1996	16	Good
8023	Dismal Creek (Horse Camp)	Horse Camp	Post	6/7/2007	15	Good
8023	Dismal Creek (Horse Camp)	Horse Camp	Post	4/21/2009	18	Very Good
8023	Dismal Creek (Horse Camp)	Horse Camp	Post	5/20/2010	17	Very Good
8023	Dismal Creek (Horse Camp)	Horse Camp	Post	5/20/2011	12	Poor/Fair
8023	Dismal Creek (Horse Camp)	Horse Camp	Post	5/2/2012	14	Good
8023	Dismal Creek (Horse Camp)	Horse Camp	Post	4/29/2013	17	Very Good
8065	Nobusiness Creek	Inventory		7/30/1994	13	Good
8066	Stand Rock Branch Trib	Inventory		12/6/1994	9	Poor/Fair
8074	Dismal Creek (Upper)	Horse Trail	Pre	7/30/1994	6	Very Poor
8074	Dismal Creek (Upper)	Horse Trail	Post	6/7/2007	10	Poor/Fair
8092	Pondlick Branch (Upper)	Other		5/1/2001	15	Good
8093	Pondlick Branch (Lower)	Other		5/1/2001	15	Good
8096	Stand Rock Branch	Inventory		5/18/1998	14	Good
8096	Stand Rock Branch	Inventory		3/29/2004	15	Good
8096	Stand Rock Branch	Inventory		5/19/2005	17	Very Good
8156	Standrock middle	Inventory		3/29/2004	17	Very Good
8156	Standrock middle	Inventory		5/19/2005	15	Good
8157	Standrock upper	Inventory		3/29/2004	16	Good
8157	Standrock upper	Inventory		5/19/2005	15	Good
8159	Horse Camp East	Inventory		5/19/2005	16	Good

Water quality samples were likewise collected from these streams to evaluate the current conditions of water chemical properties and to monitor changes over time. Nine chemical parameters associated with

the effects of acid deposition and nutrient loading are measured in each sample, including pH, acid neutralizing capacity (ANC), and nitrate (NO3). Water samples from Nobusiness Creek which drains acid sensitive geology, have pH's in the 4 to 5 range, and very low ANC values, indicating chronically acidic conditions. Nobusiness Creek is part of the Virginia Trout Stream Sensitivity Study and has 118 water chemistry samples collected quarterly since 1987. Only some of the most recent quarterly data is shown below. The remaining stream samples reflect the inclusion of a more carbonate geology within the watershed and no values that indicate an existing water quality issue (see Table 2 below).

Table 2. Water quality parameters for Project Area Streams

Location ID	Stream Name	Sample Date	pH	A NC ueq/L	CA ueq/L	Mg ueq/L	Na ueq/L	K ueq/L	Cl ueq/L	NO3 ueq/L	SO4 ueq/L
7038	Peak Creek	10/18/96	6.85	108.00	60.90	74.50	39.80	33.80	8.01	1.9	60.4
8006	Nobusiness Creek	02/03/17	5.11	-3.67	14.09	20.41	12.17	5.9	13.12	0	45.13
8006	Nobusiness Creek	04/26/17	4.92	-5.23	13.54	17.26	11.41	7.18	11.84	0.22	47.09
8006	Nobusiness Creek	07/27/17	5.36	3.25	14.72	19.36	12.99	9.04	13.97	0	23.02
8006	Nobusiness Creek	10/30/17	4.89	-9.55	14.74	18.99	11.6	6.78	14.41	0	46.36
8023	Dismal Creek	03/10/10	6.40	48.911	93.795	61.783	17.258	9.7139	16.584	0.9815	55.56
8023	Dismal Creek	05/02/12	6.82	77.12	134.46	57.49	15.67	8.7	18.26	0.04	55.22
8023	Dismal Creek	05/03/18	5.63	94.04	136.75	54.53	16.98	9.65	16.44	1.66	45.41
8023	Dismal Creek (Horse Camp)	04/29/13	6.68	89.726	144.75	60.72	15.56	8.44	14.74	0.09	54.18
8066	Stand Rock Branch Trib	03/24/99	7.17	120	46.5	38.1	14	45.3	23.7	1.69	60.2
8090	Whiskey Still Hollow (Upper)	08/18/98	6.44	202	154	132	82.6	58.8	16.9	9.69	75.6
8090	Whiskey Still Hollow (Upper)	03/15/99	7.22	148	35.1	52.1	22.1	15.6	16.2	3.19	170
8091	Whiskey Still Hollow (Lower)	08/18/98	6.96	294	133	136	91.3	61.4	16.9	9.69	81.6
8091	Whiskey Still Hollow (Lower)	03/15/99	6.93	83	38.4	59.6	21	14.8	16.9	3.5	73.7
8092	Pondlick Branch (Upper)	08/18/98	6.95	304	172	165	135	58.8	39.5	16.1	120
8092	Pondlick Branch (Upper)	03/15/99	7.00	89	43	59.5	30.1	14.6	23.7	3.5	95.6
8093	Pondlick Branch (Lower)	08/18/98	7.12	279	187	173	104	56.3	31.6	16.1	116
8093	Pondlick Branch (Lower)	03/15/99	6.91	69.5	43.3	60.1	30.3	14.9	23.8	3.69	93.3
8096	Stand Rock Branch	03/03/04	7.07	183	153	51.6	16.5	6.8	16.9	9	38.3
8096	Stand Rock Branch	02/16/05	7.05	144	144	44.3	18.2	7.29	19.9	1.1	35.8

Future Actions

There is a high probability that approximately 1,000 acres would be burned in and around Units 1-8 of the Gatewood area within the next five years. There will be the continued use and maintenance of the horse camp and trails in the Dismal Creek watershed, as well as the Appalachian Trail. No other foreseeable future projects are planned on National Forest System (NFS) land within the project areas at this time may have an effect on aquatic biota.

Direct, Indirect, and Cumulative Effects of the Alternatives

Proposed Action

The Proposed Action has the potential to affect water resources and aquatic biota as a result of the proposed actions of timber harvesting activities, road construction, and herbicide treatment. There are 46 harvest units (1076 acres), and ? miles of temporary road construction proposed in this alternative. Approximately 787 acres will be treated with a basal bark herbicide application of triclopyr with an adjuvant to control non-native species, red and striped maple and other undesirable species throughout the thinning stands and open oak woodland areas. Temporary road approaches to streams will be graveled and crossings will be designed according to Forest Plan standards.

No timber harvest or ground disturbing activities would occur in protected riparian corridors for perennial and intermittent streams. Forest harvesting can directly affect sediment transport in streams if it increases (or decreases) the supply of sediment, if it alters the peak flow or the frequency of high flows, and if it changes the structure of the channel by removing the supply of large woody debris that forms sediment storage sites. Bank erosion and lateral channel migration also contribute sediments if protective vegetation and living root systems are removed (Chamberlin et al. 1991). Through application of mitigation measures and Best Management Practices, these impacts can be largely avoided. The physical removal of timber at sites away from the streams poses very little direct threat to the aquatic resource or organisms. The use and construction of roads, skid trails, and log landings could increase the amount of sediment entering the stream system during periods of high flow. Sediment loading in streams affects the aquatic fauna directly and indirectly. Direct effects include damage to gills by abrasion of suspended particles. Indirect effects come from a reduction in available dissolved oxygen, and reduced surface area and spawning habitat due to substrate being covered with sediment. Application of mitigation measures and Best Management Practices will minimize the amount of sediment actually reaching the streams.

If a riparian buffer zone were not left along the streams in the project area, reduction of streamside canopy could affect the physical characteristics of the stream channel and can also affect food quality and quantity for stream organisms directly and indirectly. Direct effects occur by changing the input of particulate food (leaf litter). Indirect effects come from alteration of the structure and productivity of the microbial food web through shading and modifying the levels of dissolved organic carbon and nutrients. A 2-5 degree C warming of small streams can affect life history characteristics of macroinvertebrates and developmental time of fish eggs (Sweeney, 1993). These potential impacts will be negligible since,

under all alternatives, a riparian corridor buffer zone will be left along each stream. The width of this zone depends on the size/characteristics of the stream and is consistent with the Forest Plan direction for MA 11, riparian areas and the Virginia BMPs. The primary function of this zone is to manage the area for riparian dependent resources. An additional function of this zone is to stabilize the stream bank, to moderate water temperature and promote the growth of desirable algae via shading, to provide soil/water contact area for biogeochemical processing of nutrients, and to contribute necessary organic detritus and large woody debris to the stream ecosystem.

The proposed actions would not increase the amount of LWD in any stream. However, protection of the riparian area would allow for the natural recruitment of LWD in the future. Future recruitment of LWD is expected to improve the amount and distribution of pool habitat in area streams in the future. This riparian area would also provide shading of the stream to maintain current thermal characteristics and microbial (algal, bacteria) structure and productivity. Minimal to undetectable impacts to aquatic plants and animals as a result of commercial timber harvest, temporary road and log landing construction in the proposed manner are expected.

Herbicide treatment in the proposed action involves a basal bark herbicide application of triclopyr (20% mixture in oil) with an adjuvant to control non-native species and other undesirable species throughout the regenerated areas. Herbicides used to treat non-native species and undesirable species in competition with oak species will not be applied within 30 horizontal feet of wetlands, perennial or intermittent springs, and streams or standing water that would carry into streams. In the 9A1- Source Water Protection Watersheds prescription areas, herbicides will not be applied within 100 horizontal feet of wetlands, perennial or intermittent springs, and streams or standing water that would carry into streams (FW-100, Forest Plan p. 2-29). Triclopyr is not soil active (herbicide adheres to soil particles once applied); therefore, does not travel in the soil layer to water bodies.

The use of design elements, BMP's and avoidance of impacts in riparian areas would result in negligible impact to aquatic biota or aquatic and riparian MIS, specifically wild brook trout and TES. Some minor sedimentation can be expected from harvest activities. The current proposal eliminated three potential units in Standrock Branch watershed; the confluence of Standrock Branch with Dismal Creek is the upper limit of the proposed critical habitat for the candy darter. The elimination of these units decreases the amount of ground disturbance that would have occurred with the construction and use of roads, skid trails, and landings, thus decreasing the amount of potential erosion and sedimentation to stream habitat. As discussed in the Hydrology section, no alternative should produce sediment that will be outside the natural range of variability or have a significant impact on the beneficial uses of area streams. The minor sediment increases are unmeasurable and insignificant in comparison to the sediment load of streams in the analysis area and will have no significant effect on habitat for fish or other aquatic life. The modeled sediment increases in the Dismal Creek watershed are unmeasurable and insignificant in comparison to the sediment load of Dismal Creek, and will have no significant effect on habitat for fish or other aquatic life downstream in Dismal Creek or Kimberling Creek, including candy darter and green floater. The mitigation and design criteria sections of this EA contains measures that will be used to reduce sedimentation and protect the beneficial uses.

Alternative A

Alternative A includes all of the actions described for the proposed action, with the exception of herbicide treatments for Units 1, 2, and 4 in the Peak Creek Working Area. These units would be excluded from herbicide treatments as they include 9A1- Source Water Protection Watersheds prescription areas. Total acreage excluded is approximately 40 acres.

Effects to aquatic resources from management activities will be similar to the Proposed Action, described above. However, since there is no herbicide treatment in 9A1, a municipal watershed, in comparison with the Proposed Action, and as detailed in the Hydrology report, the overall impact and risk to aquatic resources is less.

No Action

Under this alternative, watershed and streamside vegetation and soil would remain unchanged and continue to provide shading and a future source of nutrients and large woody debris. There will be no impact to the aquatic ecosystem due to vegetative management.

References

Chamberlin, T.W., R.D. Harr, and F.H. Everest. 1991. Timber harvesting, Silviculture, and Watershed Processes, in: Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitat. American Fisheries Society Special Publication 19:181-205.

Environmental Protection Agency (EPA) 1989, Rapid Bioassessment Protocols for use in Streams and Rivers: Benthic Macroinvertebrates and Fish. USEPA Report 444/4-89/001. Office of Water Regulations and Standards. USEPA. Washington, DC.

Kirk, D. and F. Huber. 2004. George Washington and Jefferson National Forests Federally Listed Threatened and Endangered Mussel and Fish Conservation Plan. U.S. Forest Service. Roanoke, VA. 66pp.

Rapid Bioassessment Reports, GWJNF, 2019.

Smith, E.P. and J. Reese Voshell, Jr. 1997. Studies of benthic macroinvertebrates and fish in streams within EPA Region 3 for the development of biological indicators of ecological condition. Part 1 Benthic macroinvertebrates. Final Report January 24, 1997 Virginia Polytechnic Institute and State University, Blacksburg, VA 24061; Cooperative Agreement CF821462010, 23p.

Smith, Eric P., and Reese Voshell. 2013. Analysis of Benthic Metrics in GWJ. Final Report Submitted to the George Washington & Jefferson National Forest, June 29, 2013.

Sweeney, B.W. 1993. Effects of streamside vegetation on macroinvertebrate communities of White Caly Creek in eastern North America. Proceedings of the Academy of Natural Sciences of Philadelphia. 144:291-340.

Virginia Fish and Wildlife Information Service, 2019. Species Observation Report dated August 2, 2016. https://vafwis.dgif.virginia.gov/fwis